

WHAT IS CLAIMED IS:

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1. A multibeam scan apparatus comprising:
a light source having semiconductor laser
diodes and coupling lenses arranged in a main scan
direction, the semiconductor laser diodes being
10 positioned so that light beams emitted by the
semiconductor laser diodes substantially cross each
other at a point;

a light beam restricting unit shaping the
light beams from the laser diodes through the coupling
15 lenses so that the light beams have a given spot size,
the light beam restricting unit being positioned close
to the point;

a polygonal mirror; and

a scan lens causing the light beams reflected
20 by the polygonal mirror to form images on a scanned
surface.

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2. The multibeam scan apparatus as claimed in claim 1, wherein:

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the light beam restricting unit is incorporated into each of reflection surfaces of the polygonal mirror; and

overfilled
the spot size of the light beams incident to the polygonal mirror is larger than a size of each of the reflection surfaces in at least the main scan direction.

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3. The multibeam scan apparatus as claimed in claim 2, wherein each of the reflection surfaces of the polygonal mirror has an edge shorter than surfaces of the polygonal mirror in which the reflection surfaces are formed.

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4. The multibeam scan apparatus as claimed in claim 1, wherein the coupling lenses change the light beams to those having a divergence.

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5. A multibeam scan apparatus comprising:
a light source having a semiconductor laser diode array of light-emitting sources, and a coupling lens, the light-emitting sources being arranged in a
5 main scan direction;

a convergent unit causing the light beams to converge in the main scan direction;

a light beam restricting unit shaping the light beams so as to have a given spot size, the light
10 beam restricting unit being positioned close to a position at which the light beams cross each other due to a function of the convergent unit;

a polygonal mirror; and

a scan lens causing the light beams reflected
15 by the polygonal mirror to form images on a scanned surface.

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6. The multibeam scan apparatus as claimed in claim 5, wherein:

the light beam restricting unit is incorporated into each of reflection surfaces of the
25 polygonal mirror; and

the spot size of the light beams incident to the polygonal mirror is larger than a size of each of the reflection surfaces in at least the main scan direction.

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7. The multibeam scan apparatus as claimed in claim 6, wherein each of the reflection surfaces of the polygonal mirror has an edge shorter than surfaces of the polygonal mirror in which the reflection surfaces are formed.

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8. The multibeam scan apparatus as claimed in claim 5, wherein the coupling lens changes the light beams to those having a divergence.

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9. A multibeam scan apparatus comprising:

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a light source emitting light beams, outgoing beam directions in which the light beams travel being arranged so as to cross each other;

a deflection unit deflecting the light beams;

5 and

an optical unit causing the light beams from the deflection unit to form images on a scanned surface.

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10. The multibeam scan apparatus as claimed in claim 9, wherein the light beams emitted by the light source cross each other at a position close to the deflection unit.

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11. The multibeam scan apparatus as claimed in claim 10, further comprising a light beam restricting unit shaping the light beams so as to have a given spot size, the light beam restricting unit being positioned close to said position.

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12. The multibeam scan apparatus as claimed in claim 11, wherein the light beams cross each other on a deflection surface of the deflection unit.

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13. The multibeam scan apparatus as claimed in claim 9, further comprising a light beam restricting unit shaping the light beams so as to have a given spot size, the light beam restricting unit being positioned close to a position at which the light beams cross each other.

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14. The multibeam scan apparatus as claimed in claim 11, wherein the light beam restricting unit is incorporated into deflection surfaces of the deflection unit, and the given spot size of the light beams is larger than a size of each of the deflection surfaces.

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15. The multibeam scan apparatus as claimed
in claim 13, wherein the light beam restricting unit is
incorporated into deflection surfaces of the deflection
unit, and the given spot size of the light beams is
5 larger than a size of each of the deflection surfaces.

10 16. The multibeam scan apparatus as claimed
in claim 14, wherein each of the deflection surfaces of
the deflection unit has an edge shorter than surfaces of
the deflection unit in which the deflection surfaces are
formed.

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20 17. The multibeam scan apparatus as claimed
in claim 15, wherein each of the deflection surfaces of
the deflection unit has an edge shorter than surfaces of
the deflection unit in which the deflection surfaces are
formed.

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18. A multibeam scan apparatus comprising:
a light source having semiconductor laser
diodes and coupling lenses arranged in a main scan
direction, the semiconductor laser diodes being
5 positioned so that outgoing beam directions in which
light beams emitted by the semiconductor laser diodes
travel cross each;
a deflection unit deflecting the light beams;
and
10 an optical unit causing the light beams to
form images on a scanned surface.

15 19. The multibeam scan apparatus as claimed
in claim 18, wherein the light beams cross each other at
a position close to the deflection unit.

20 20. The multibeam scan apparatus as claimed
in claim 19, further comprising a light beam restricting
25 unit shaping the light beams so as to have a given spot

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23. The multibeam scan apparatus as claimed
25 in claim 20, wherein the light beam restricting unit is

incorporated into deflection surfaces of the deflection unit, and the given spot size of the light beams is larger than a size of each of the deflection surfaces.

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24. The multibeam scan apparatus as claimed in claim 22, wherein the light beam restricting unit is
10 incorporated into deflection surfaces of the deflection unit, and the given spot size of the light beams is larger than a size of each of the deflection surfaces.

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25. The multibeam scan apparatus as claimed in claim 23, wherein each of the deflection surfaces of the deflection unit has an edge shorter than surfaces of
20 the deflection unit in which the deflection surfaces are formed.

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26. The multibeam scan apparatus as claimed
in claim 24, wherein each of the deflection surfaces of
the deflection unit has an edge shorter than surfaces of
the deflection unit in which the deflection surfaces are
5 formed.

10 27. A multibeam scan apparatus comprising:
a light source having a semiconductor laser
diode array of light-emitting sources formed in a
monolithic formation, and a coupling lens, the light-
emitting sources being arranged in a main scan
15 direction;
a convergent unit causing the light beams to
converge in the main scan direction;
a light beam restricting unit shaping the
light beams so as to have a given spot size, the light
20 beam restricting unit being positioned close to a
position at which the light beams cross each other due
to a function of the convergent unit;
a deflection unit deflecting the light beams;
and
25 a scan lens causing the light beams deflected

by the deflection unit to form images on a scanned surface.

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28. The multibeam scan apparatus as claimed in claim 27, further comprising a light beam restricting unit shaping the light beams so as to have a given spot size, the light beam restricting unit being positioned close to said position.

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29. The multibeam scan apparatus as claimed in claim 27 wherein:

the light beam restricting unit is incorporated into each of deflection surfaces of the deflection unit; and

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the spot size of the light beams incident to the deflection unit is larger than a size of each of the deflection surfaces in at least the main scan direction.

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